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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,891	CHO ET AL.	
	Examiner	**Art Unit**	
	JESSICA ROBERTS	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *10/24/2007;11/15/2007;7/7/2008;2/23/2010*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicants election without traverse of species 5 (claims 1-48) in the reply filed on 11/13/2009 is acknowledged.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2,8,12,18,22,26,29,32,35 and 35 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Re claims 2,8,12,18,22,26,29,32,35 and 35 recite "outputting them as a single stream". The term "them" renders the claim indefinite.

4. Claim 17 recites the limitation "the vertical disparity map.. " in step (e) and (h). There is insufficient antecedent basis for this limitation in the claim.

5. Claim 39 recites the limitation "the first auxiliary.. " in line 1. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 43 recites the limitation "the vertical disparity map.. " in line 5-6 and 14-15. There is insufficient antecedent basis for this limitation in the claim.

7.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

   1. Determining the scope and contents of the prior art.
   2. Ascertaining the differences between the prior art and the claims at issue.
   3. Resolving the level of ordinary skill in the pertinent art.
   4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-38 and 41-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. US-2002/0009137 A1 in view of International Orginization for Standardisation Organsiation Internationale De Normalisation ISO/IEC JTC1/C29/WG11 Coding of Moving Pictures and Audio (ISO).

4. As to **claim 1**, Nelson teaches A method for encoding stereoscopic video (fig. 12) including first and second images, comprising: (a) encoding the first image (fig. 12 element 404), and outputting a quantized video object and a motion vector of the first image (The enhancement encoding block 402 preferably also includes an enhancement stream encoder 404 for receiving the right view video stream to perform motion based prediction and for encoding the right video stream to the enhancement stream using

both the disparity based prediction and motion based prediction, [0134] and fig. 12 element 404) ; (b) receiving the first and second images (right video stream and left video stream input to the disparity estimator, fig. 12 element 406, and [0134]), and finding a pixel-based disparity on the second image with reference to the first image (Nelson discloses disparity compensator 408 to estimate and compensate for the disparity between the left and right views, [0134] and fig. 12 element 408. Since Nelson discloses the disparity compensator is used to compensate for the disparity of the left and right views, it is clear to the Examiner that Nelson, more than fairly teaches to estimate and compensate for the disparity between the left and right views, which reads upon the claimed limitation); and (c) encoding the disparity and outputting a motion vector (Nelson discloses where the output of the disparity compensator is input to the Enhancement Stream Motion Compensated DCT Encoder (12:404), since the output of the disparity compensator is input to the Enhancement Stream Motion Compensated DCT Encoder, it is clear to the Examiner, that Nelson, encodes the disparity (the disparity of the left and right views) and output a motion vector, which reads upon the limitation as claimed.

Nelson is silent in regards to encoding the horizontal disparity map, and outputting a quantized horizontal disparity map.

However, ISO discloses to encode the horizontal disparity map (fig. 1 element disparity, map which is input to the encoder, fig. 1 element MPEG-4 encoder. Further, since ISO takes the different between the left and right images, this difference is known in the art the as a horizontal difference) and outputting a quantized disparity map (ISO

discloses where the disparity map is encoded in fig. 1. Since the disparity map is encoded and quantization is essential to encoding, it is clear to the Examiner that the encoded disparity map in ISO is also quantized during the completion of encoding process. Thus, encoding the disparity map reads upon the claimed limitation). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson for improving the image quality of reconstructed images.

As to claim 2, Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 1. Nelson is silent in regards to the method of claim 1, further comprising (d) performing variable length encoding on the quantized video object, the motion vector, and the quantized horizontal disparity map, and outputting them as a single stream.

However, ISO teaches performing variable length encoding on the quantized video object, the motion vector, and the quantized horizontal disparity map, and outputting them as a single stream (fig. 1; output of the disparity estimation which is input to the disparity map with left and right image which is further input to the MPEG-4 encoder and finally output as a single stream leaving the MPEG-4 encoder).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to claim 3, Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 1. Nelson is silent in regards to the method of claim 1, wherein the quantized horizontal disparity map is allocated to an auxiliary component of a disparity type of the MPEG-4 MAC (multiple auxiliary component) and is encoded.

However, ISO teaches wherein the quantized disparity map is allocated to an auxiliary component of a disparity type of the MPEG-4 MAC (multiple auxiliary component) and is encoded (disparity map in put to MPEG-4 encoder; fig. 1. Further, ISO discloses where fig. 1 is a block diagram of stereoscopic video coding using MAC only with disparity map for right eye).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 4,** Nelson (modified by ISO and Kim) as a whole teaches everything as claimed above, see claim 1. In addition, Nelson teaches the method of claim 1, wherein the first image is a left image, and the second image is a right image (see fig. 12, right and left video streams).

As to **claim 5**, Nelson teaches a method for decoding stereoscopic video including first and second images, comprising: (a) receiving an encoding stream (enhancement stream motion compensated DCT decoder (418) and (base stream motion compensated DCT decoder (422), fig. 12), and outputting quantized data of a video object of the first image (output from enhancement stream motion compensated

dct decoder, fig. 12 element 418), a motion vector , and a quantized data of a horizontal disparity map; (b) decoding the video object and reconstructing the first image based on the quantized data of the video object and the motion vector (fig. 12).

Nelson is silent in regards to decoding the quantized data of the horizontal disparity map based on the quantized data of the horizontal disparity map and the motion vector; and (d) performing disparity compensation based on the reconstructed first image and the decoded horizontal disparity map, and reconstructing the second image.

However, ISO teaches decoding the quantized data of the horizontal disparity map based on the quantized data of the horizontal disparity map and the motion vector (fig. 1); and (d) performing disparity compensation based on the reconstructed first image and the decoded horizontal disparity map, and reconstructing the second image (fig. 1 elements MPEG-4 decoder, reconstructed disparity map added with reconstructed left image to output the reconstructed right image).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 6**, Nelson, (modified by ISO) as a whole teaches everything as claimed above, see claim 5. In addition, Nelson teaches wherein the first image is a left image, and the second image is a right image (see fig. 12 elements right and left video stream).

As to **claim 7**, which substantially the same as claim 1, in addition to (e) reconstructing the quantized horizontal disparity map output in (d), and outputting a reconstructed horizontal disparity map; (f) performing disparity compensation and outputting a pixel value of a disparity-compensated second image based on pixel value of the first image reconstructed in (b) and a horizontal disparity vector value of the horizontal disparity map reconstructed in (e); and performing residual process on the pixel value of the second image and the pixel value of the disparity-compensated second image output in (f) to output the luminance residual texture, and encoding the luminance residual texture to output quantized luminance residual texture.

However, ISO teaches reconstructing the quantized horizontal disparity map output in (d) (fig. 1 & 2 element reconstructed disparity map), and outputting a reconstructed horizontal disparity map (fig. 1 and 2, element reconstructed disparity map output to the compensated right image); (f) performing disparity compensation and outputting a pixel value of a disparity-compensated second image based on pixel value of the first image reconstructed in (b) and a horizontal disparity vector value of the horizontal disparity map reconstructed in (e); and performing residual process on the pixel value of the second image and the pixel value of the disparity-compensated second image output in (f) to output the luminance residual texture, and encoding the luminance residual texture to output quantized luminance residual texture.

As to **claim 8,** Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 7. Nelson is silent in regards to the method of claim 7, further

comprising (h) performing variable length coding on the quantized video object, the motion vector, the quantized luminance residual texture, and outputting them as a single stream.

However, ISO teaches performing variable length coding on the quantized video object (fig. 2; left and right image input to the MPEG-4 encoder), the motion vector, the quantized luminance residual texture (fig. 2; residual texture input to the , and outputting them as a single stream

As to **claim 9,** Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 7. Nelson, is silent in regards to the method of claim 7, wherein the quantized horizontal disparity map and the quantized luminance residual texture are allocated to the MPEG-4 MAC and the encoded.

However, ISO teaches the quantized horizontal disparity map and the quantized luminance residual texture are allocated to the MPEG-4 MAC and the encoded (Figure 2 describes Coding_mehtod_2. The major difference between the Coding_Method_1 and *Coding_method_2* is the addition of the residual texture coding. Residual texture means that the difference image between the original right-image and the disparity-compensated right-image obtained using the locally reconstructed left-image and the locally reconstructed disparity map. *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC, EE-Stereoscopic video coding using MAC and fig. 2).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 10**, Nelson (modified by) as a whole teaches everything as claimed above, see claim 9. In addition, Nelson teaches wherein the first image is a left image, and the second image is a right image (see fig. 12; left and right video stream).

As to **claim 11**, Nelson (modified by) as a whole teaches everything as claimed above, see claim 10. Nelson is silent regarding the method of claim 7, further comprising (h) performing a residual process on the pixel value of the second image and the pixel value of the disparity-compensated second image output in (f) to output chrominance residual texture, and encoding the chrominance residual texture to output quantized chrominance residual texture.

However, ISO teaches performing a residual process on the pixel value of the second image and the pixel value of the disparity-compensated second image output in (f) to output chrominance residual texture, and encoding the chrominance residual texture to output quantized chrominance residual texture (Figure 2 describes Coding_mehtod_2. The major difference between the Coding_Method_1 and *Coding_method_2* is the addition of the residual texture coding. Residual texture means that the difference image between the original right-image and the disparity-compensated right-image obtained using the locally reconstructed left-image and the locally reconstructed disparity map. *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, one

component for the luminance data of the residual texture, and the remaining one for the chrominance data of the residual texture. Since the chrominance data is half the size of the luminance data in case of 4:2:0, the chrominance data will be placed in the first half of the last MAC component, see EE-Stereoscopic video coding using MAC and fig. 2).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 12**, Nelson (modified by) as a whole teaches everything as claimed above, see claim 11. Nelson is silent in regards to the method of claim 11, further comprising (i) performing variable length encoding on the quantized video object, the motion vector, the quantized horizontal disparity map, the quantized luminance residual texture, and the quantized chrominance residual texture, and outputting them as a single stream.

However, ISO teaches performing variable length encoding on the quantized video object (fig. 2; element left-image and right image input to the MPEG-4 encoder), the motion vector, the quantized horizontal disparity map (ISO discloses that *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, EE-Stereoscopic video coding using MAC and fig. 2. Since *Coding_method_2* has a component where the disparity is assigned, it is clear to the Examiner that the disparity map is encoded with the assigned component which reads upon the claimed limitation), the quantized luminance residual texture

(*Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, one component for the luminance data of the residual texture, EE-Stereoscopic video coding using MAC and fig. 2. Since *Coding_method_2* has a component where for the luminance data of the residual texture, it is clear to the Examiner that the residual texture is encoded with the assigned component which reads upon the claimed limitation) and the quantized chrominance residual texture (3 components of MAC: one component for disparity map, one component for the luminance data of the residual texture, and the remaining one for the chrominance data of the residual texture, EE-Stereoscopic video coding using MAC and fig. 2. Since *Coding_method_2* discloses the MAC has a component for the chrominance data of the residual texture, it is clear to the Examiner that the chrominance data of the residual texture is encoded with the assigned component which reads upon the claimed limitation) and outputting them as a single stream (fig. 2; output from MPEG-4 encoder that contains the coded residual texture, coded left image; and coded disparity map).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim** 13, Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 11. Nelson is silent in regards to the method of claim 11, wherein the quantized horizontal disparity map, the quantized luminance residual

texture, and the quantized chrominance residual texture are allocated to the MPEG-4 MAC and then encoded.

However, ISO teaches wherein the quantized horizontal disparity map, the quantized luminance residual texture, and the quantized chrominance residual texture are allocated to the MPEG-4 MAC and then encoded (Figure 2 describes Coding_mehtod_2. The major difference between the Coding_Method_1 and *Coding_method_2* is the addition of the residual texture coding. Residual texture means that the difference image between the original right-image and the disparity-compensated right-image obtained using the locally reconstructed left-image and the locally reconstructed disparity map. *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, one component for the luminance data of the residual texture, and the remaining one for the chrominance data of the residual texture. Since the chrominance data is half the size of the luminance data in case of 4:2:0, the chrominance data will be placed in the first half of the last MAC component, see EE-Stereoscopic video coding using MAC and fig. 2).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 14**, which substantially the same as claim 5, in addition to receiving a quantized data of luminance residual texture; decoding the quantized data of the luminance residual texture based on the quantized data of the luminance residual texture and the motion vector; outputting disparity-compensated luminance texture; and

adding the disparity-compensated luminance texture and the luminance residual texture reconstructed to reconstruct the second image, thus the rejection and analysis made for claim 5 also applies for common subject matter.

ISO teaches receiving a quantized data of luminance residual texture (input to MPEG-4 decoder, fig. 2. Since ISO discloses *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, one component for the luminance data of the residual texture and the remaining one for the chrominance data of the residual texture, and this data is encoded to a single stream and output of the MPEG-4 encoder and input to the MPEG-4 decoder, fig. 2 and EE-Stereoscopic Video coding using MAC); outputting disparity-compensated luminance texture (fig. 2); and adding the disparity-compensated luminance texture and the luminance residual texture reconstructed to reconstruct the second image (fig. 2; fig. 2 clearly discloses that the reconstructed left image and the reconstructed disparity map are added together to compensated right-image which is further added tot he reconstructed residual texture, that is yields the reconstructed right image, see fig. 2).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 14**, Nelson (modified by ISO) as whole teaches everything as claimed above, see claim 14. In addition, Nelson teaches the method of claim 14,

wherein the first image is a left image, and the second image is a right image (see fig. 12; left and right video stream).

As to **claim 16**, Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 14. Nelson is silent in regards to, wherein the step (a) comprises receiving the encoding stream (fig. 2, input to MPEG-4 decoder), and additionally outputting quantized data of chrominance residual texture, the step (d) comprises additionally decoding the quantized data of chrominance residual texture based on the quantized data of chrominance residual texture and the motion vector, and the step (f) comprises additionally adding the disparity-compensated chrominance texture and the chrominance residual texture to reconstruct the second image.

As to claim 17, which is substantially the same as claim 7 in addition to encoding the vertical disparity map and outputting a quantized vertical disparity map based on the pixel-based vertical disparity map and the motion vector; reconstructing the quantized vertical disparity map output in (d); and outputting a reconstructed vertical disparity map; and a vertical disparity vector value of the vertical disparity map reconstructed in (h), thus the rejection and analysis made for claim 7 also applies here common subject matter.

ISO teaches encoding the vertical disparity map and outputting a quantized vertical disparity map based on the pixel-based vertical disparity map and the motion vector; reconstructing the quantized vertical disparity map output in (d); and outputting a reconstructed vertical disparity map (fig. 2 element reconstructed disparity map and the

output of the disparity map); and a vertical disparity vector value of the vertical disparity map reconstructed in (h) (ISO discloses that *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, one component for the luminance data of the residual texture, and the remaining one for the chrominance data of the residual texture, see *Coding_method_2 (Extensions of MPEG-4 coding tool using MAC* and fig.2. Since ISO discloses that coding method 2 assigns a component for the disparity map in MAC, it is clear to the Examiner that the disparity map is encoded. Further, ISO takes the disparity of the left and right image, and the disparity is the difference between the two images, it is clear to the Examiner that in order to determine the disparity of the left and right image, the difference in both horizontal and vertical direction would be estimated, which reads upon the claimed limitation)

As to **claim 18**, which is substantially the same as claim 12 in addition to a the quantized vertical disparity map, thus the rejection and analysis made claim 12 also applies here.

ISO discloses that *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, one component for the luminance data of the residual texture, and the remaining one for the chrominance data of the residual texture, see *Coding_method_2 (Extensions of MPEG-4 coding tool using MAC* and fig.2. Since ISO discloses that coding method 2 assigns a component for the disparity map in MAC, it is clear to the Examiner that the disparity map is encoded. Further, ISO takes the disparity of the left and right image, and the disparity is the

difference between the two images, it is clear to the Examiner that in order to determine the disparity of the left and right image, the difference in both horizontal and vertical direction would be estimated, which reads upon the claimed limitation).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 19**, which is substantially the same as claim 13, in addition to the quantized vertical disparity map, and the quantized luminance residual texture are allocated to the MPEG-4 MAC and then encoded, thus the rejection and analysis made in claim 13 also applies here for common subject matter.

ISO teaches that quantized vertical disparity map, and the quantized luminance residual texture are allocated to the MPEG-4 MAC and then encoded (Figure 2 describes Coding_mehtod_2. The major difference between the Coding_Method_1 and *Coding_method_2* is the addition of the residual texture coding. Residual texture means that the difference image between the original right-image and the disparity-compensated right-image obtained using the locally reconstructed left-image and the locally reconstructed disparity map. *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, one component for the luminance data of the residual texture, and the remaining one for the chrominance data of the residual texture. Since the chrominance data is half the size of the luminance data in case of 4:2:0, the chrominance data will be placed in the first half

of the last MAC component, see *Coding_method_2 (Extension of MPEG-4 coding tool using MAC* and fig. 2. Further, ISO takes the disparity of the left and right image, and the disparity is the difference between the two images, it is clear to the Examiner that in order to determine the disparity of the left and right image, the difference in both horizontal and vertical direction would be estimated, which reads upon the claimed limitation).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 20**, Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 17. In addition Nelson teaches where in the first image is a left image, and the second image is a right image (see fig. 12).

As to **claim 21**, Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 19. Nelson is silent in regards to the method of claim 17, further comprising (j) performing a residual process on the pixel value of the second image and the pixel value of the disparity-compensated second image output in (h) to output chrominance residual texture, and encoding the chrominance residual texture to output quantized chrominance residual texture.

However, ISO teaches performing a residual process on the pixel value of the second image and the pixel value of the disparity-compensated second image output in (h) to output chrominance residual texture, and encoding the chrominance residual texture to output quantized chrominance residual texture (fig. 2).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 22**, Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 21. Nelson is silent in regards to the method of claim 21, further comprising (k) performing variable length encoding on the quantized video object, the motion vector, the quantized horizontal disparity map, the quantized vertical disparity map, the quantized luminance residual texture, and the quantized chrominance residual texture, and outputting them as a single stream.

However, ISO teaches performing variable length encoding on the quantized video object, the motion vector, the quantized horizontal disparity map, the quantized vertical disparity map, the quantized luminance residual texture, and the quantized chrominance residual texture, and outputting them as a single stream. (Figure 2 describes Coding_mehtod_2. The major difference between the Coding_Method_1 and *Coding_method_2* is the addition of the residual texture coding. Residual texture means that the difference image between the original right-image and the disparity-compensated right-image obtained using the locally reconstructed left-image and the locally reconstructed disparity map. *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, one component for the luminance data of the residual texture, and the remaining one for the chrominance data of the residual texture. Since the chrominance data is half the size of

the luminance data in case of 4:2:0, the chrominance data will be placed in the first half of the last MAC component, see *Coding_method_2 (Extensions of MPEG-4 coding tool using MAC* and fig. 2).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 23**, which is substantially the same as claim 14, in addition to quantized vertical disparity map; (d) decoding the quantized data of the vertical disparity map based on the quantized data of the vertical disparity map; decoding the quantized data of the luminance residual texture based on the quantized data of the luminance residual texture and the motion vector; (f) performing disparity compensation based on the reconstructed first image, the decoded horizontal disparity map, and the decoded vertical disparity map, and outputting disparity-compensated luminance texture; and (g) adding the disparity-compensated luminance texture and the luminance residual texture reconstructed in (e) to reconstruct the second image.

However, ISO teaches decoding the quantized data of the vertical disparity map based on the quantized data of the vertical disparity map; decoding the quantized data of the luminance residual texture based on the quantized data of the luminance residual texture and the motion vector; (f) performing disparity compensation based on the reconstructed first image, the decoded horizontal disparity map, and the decoded vertical disparity map, and outputting disparity-compensated luminance texture; and (g) adding the disparity-compensated luminance texture and the luminance residual texture

reconstructed in (e) to reconstruct the second image (Fig. 2. Further, Figure 2 describes Coding_mehtod_2. The major difference between the Coding_Method_1 and *Coding_method_2* is the addition of the residual texture coding. Residual texture means that the difference image between the original right-image and the disparity-compensated right-image obtained using the locally reconstructed left-image and the locally reconstructed disparity map. *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for disparity map, one component for the luminance data of the residual texture, and the remaining one for the chrominance data of the residual texture. Since the chrominance data is half the size of the luminance data in case of 4:2:0, the chrominance data will be placed in the first half of the last MAC component, see *Coding_method_2 (Extension of MPEG-4 coding tool using MAC* and fig. 2. Further, ISO takes the disparity of the left and right image, and the disparity is the difference between the two images, it is clear to the Examiner that in order to determine the disparity of the left and right image, the difference in both horizontal and vertical direction would be estimated, which reads upon the claimed limitation).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 24**, see the rejection and analysis made for claim 16.

As to **claim 25**, which recites the corresponding apparatus (encoder) of the method in claims 1-3, thus the rejection and analysis made in claims 1-3 also apply here because the apparatus of claim 25 would necessarily perform the method steps of claims 1-3.

As to claim **26**, see the rejection and analysis made for claim 2, except this is a claim to an encoder with the limitations of claim 2.

As to **claim 27**, which recites the corresponding apparatus (decoder) of the method in claim 5, thus the rejection and analysis made in claim 5 also apply here because the apparatus of claim 27 would necessarily perform the method steps of claim 5.

As to **claim 28**, which recites the corresponding apparatus (encoder) of the method in claim 7, thus the rejection and analysis made in claim 5 also apply here because the apparatus of claim 28 would necessarily perform the method steps of claim 7.

As to **claim 29**, see the rejection and analysis made for claim 8, except this is a claim to an encoder with the limitations of claim 8.

As to **claim 30,** see the rejection and analysis made for claim 9, except this is a claim to an encoder with the limitations of claim 9.

As to **claim 31**, see the rejection and analysis made for claim 11, except this is a claim to an encoder with the limitations of claim 11.

As to **claim 32**, see the rejection and analysis made for claim 12, except this is a claim to an encoder with the limitations of claim 12.

As to **claim 33**, see the rejection and analysis made for claim 13, except this is a claim to an encoder with the limitations of claim 13.

As to **claim 34**, see the rejection and analysis made for claim 17, except this is a claim to an encoder with the limitations of claim 17.

As to **claim 35**, see the rejection and analysis made for claim 18, except this is a claim to an encoder with the limitations of claim 18.

As to **claim 36**, see the rejection and analysis made for claim 19, except this is a claim to an encoder with the limitations of claim 19.

As to **claim 37**, see the rejection and analysis made for claim 20, except this is a claim to an encoder with the limitations of claim 20.

As to **claim 38**, see the rejection and analysis made for claim 22, except this is a claim to an encoder with the limitations of claim 22.

As to **claim 41**, which recites the corresponding apparatus (decoder) of the method in claim 23, thus the rejection and analysis made in claim 5 also apply here because the apparatus of claim 23 would necessarily perform the method steps of claim 23.

As to **claim 42**, see the rejection and analysis made for claim 24, except this is a claim to an encoder with the limitations of claim 24.

As to **claim 43**, see the rejection and analysis made in claim 23, except this is a claim to an encoder with the limitations of claim 22.

As to **claim 44,** see the rejection and analysis made for claim 22, except this is a claim to an encoder with the limitations of claim 22.

As to **claim 45**, Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 41. Nelson is silent in regards to the decoder of claim 41, wherein the video object decoder comprises: a dequantizer for dequantizing the quantized data of the video object output by the variable length decoder; an IDCT (inverse discrete cosine transformer) for performing inverse discrete cosine transform on the data output by the dequantizer; a motion compensator for comparing the reconstructed video object data of a previous frame with the motion vector to compensate for motion, and outputting a motion vector; and an adder for adding the video object output by the IDCT and the motion compensated data output by the motion compensator.

5. Claims 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. US-2002/0009137 A1 in view of International Orginization for Standardisation Organsiation Internationale De Normalisation ISO/IEC JTC1/C29/WG11 Coding of Moving Pictures and Audio (ISO) and further in view of Well Known Prior Art (Official Notice).

As to **claim 39**, Nelson (modified by ISO) as a whole teaches everything as claimed see claim 28. In addition, Nelson teaches the encoder of claim 28, wherein the video object encoder comprises: an encoding unit for performing a residual process on the first image and the motion compensated data (fig. 12 element 404), performing

discrete cosine transform and quantization on the data (fig. 12 element 404), and outputting a quantized video object (output from element 404, fig. 12); a decoding unit for performing dequantization and inverse discrete cosine transform on the quantized video object output by the encoding unit (fig. 12 element 418), reconstructing the video object data (fig. 12).

Nelson is silent in regards to storing the reconstructed video object data in a memory; a motion estimator for comparing the first image with the reconstructed video object data of a previous frame stored in the memory, and outputting a motion vector; and a motion compensator for comparing the motion vector output by the motion estimator with the reconstructed video object data of a previous frame stored in the memory, and outputting motion compensation data.

However, Official Notice is taken that both the benefit and concept of the limitation as claimed is notoriously well known and expected in the art. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate in Nelson (modified by ISO) for providing improved image coding and quality.

As to **claim 40**, Nelson (modified by ISO and Official Notice) as whole teaches everything as claimed above, see claim 39. Nelson is silent in regards to the encoder of claim 39, wherein the first auxiliary component encoder comprises: an encoding unit for performing a residual process on the horizontal disparity map and the motion compensated data, performing discrete cosine transform and quantization on the data, and outputting a quantized horizontal disparity map; a decoding unit for performing

dequantization and inverse discrete cosine transform on the quantized horizontal disparity map output by the encoding unit, reconstructing the horizontal disparity map, and storing the reconstructed horizontal disparity map in a memory; and a motion compensator for comparing the motion vector output by the motion estimator of the video object encoder with the reconstructed horizontal disparity map of a previous frame stored in the memory, and outputting motion compensation data.

However, ISO teaches wherein the first auxiliary component encoder comprises: an encoding unit for performing a residual process on the horizontal disparity map and the motion compensated data, performing discrete cosine transform and quantization on the data, and outputting a quantized horizontal disparity map; a decoding unit for performing dequantization and inverse discrete cosine transform on the quantized horizontal disparity map output by the encoding unit, reconstructing the horizontal disparity map, and storing the reconstructed horizontal disparity map in a memory; and a motion compensator for comparing the motion vector output by the motion estimator of the video object encoder with the reconstructed horizontal disparity map of a previous frame stored in the memory, and outputting motion compensation data (fig. 2).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of ISO with Nelson to improve the quality of the reconstructed image.

As to **claim 41**, which recites the corresponding apparatus (decoder) of the method in claim 23, thus the rejection and analysis made in claim 5 also apply here

because the apparatus of claim 23 would necessarily perform the method steps of claim 23.

As to **claim 42**, see the rejection and analysis made for claim 24, except this is a claim to an encoder with the limitations of claim 24.

As to **claim 43**, see the rejection and analysis made in claim 23, except this is a claim to an encoder with the limitations of claim 22.

As to **claim 44,** see the rejection and analysis made for claim 22, except this is a claim to an encoder with the limitations of claim 22.

As to **claim 45**, Nelson (modified by ISO) as a whole teaches everything as claimed above, see claim 41. Nelson is silent in regards to the decoder of claim 41, wherein the video object decoder comprises: a dequantizer for dequantizing the quantized data of the video object output by the variable length decoder; an IDCT (inverse discrete cosine transformer) for performing inverse discrete cosine transform on the data output by the dequantizer; a motion compensator for comparing the reconstructed video object data of a previous frame with the motion vector to compensate for motion, and outputting a motion vector; and an adder for adding the video object output by the IDCT and the motion compensated data output by the motion compensator.

Claim Rejections - 35 USC § 102

6. Claims 47-48 are rejected under 35 U.S.C. 102(e) as being anticipated by International Orginization for Standardisation Organsiation Internationale De Normalisation ISO/IEC JTC1/C29/WG11 Coding of Moving Pictures and Audio (ISO).

As to **claim 47** ISO teaches A method for encoding/decoding stereoscopic video including first and second images, wherein the first image is established as a video object, and the second image as auxiliary information of the first image is allocated to an MPEG-4 MAC and then encoded/decoded (see fig. 1, 2 and *Coding_method_2 (Extensions of MPEG-4 coding tool using MAC* and fig. 2).

As to **claim 48**, ISO teaches The method of claim 47, wherein the auxiliary information includes at least one of: a horizontal disparity map having a pixel-based horizontal disparity vector value of a right image with reference to the first image; a vertical disparity map having a pixel-based vertical disparity vector value of a right image with reference to the first image; luminance residual texture including the first image reconstructed after encoding, the second image disparity-compensated by a reconstructed disparity map, and residual image data on the luminance component on the input second image; and chrominance residual texture including the first image-reconstructed after encoding, the second image disparity-compensated by a reconstructed disparity map, and residual image data on the chrominance component on the input second image (Figure 2 describes Coding_mehtod_2. The major difference between the Coding_Method_1 and *Coding_method_2* is the addition of the residual texture coding. Residual texture means that the difference image between the original right-image and the disparity-compensated right-image obtained using the locally reconstructed left-image and the locally reconstructed disparity map. *Coding_method_2* assigns disparity map and residual texture to 3 components of MAC: one component for

disparity map, one component for the luminance data of the residual texture, and the remaining one for the chrominance data of the residual texture. Since the chrominance data is half the size of the luminance data in case of 4:2:0, the chrominance data will be placed in the first half of the last MAC component, see EE-Stereoscopic video coding using MAC and fig. 2).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSICA ROBERTS whose telephone number is (571)270-1821. The examiner can normally be reached on 7:30-5:00 EST Monday-Friday, Alt Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold can be reached on (571) 272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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